

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1-25 (cancelled)

Claim 26 (new): A process for the synthesis of a liquid melamine resin, wherein

- a) melamine, at least one aldehyde and at least one alcohol are fed to a continuous first reaction stage which has at least one stirred vessel and are reacted therein,
- b) the reaction mixture, such as a suspension, is fed to a solid-liquid phase separation apparatus for separation into a solids-rich phase (A) and a solids-poor phase (B),
- c) the solids-rich phase (A) present after the solid-liquid phase separation is recycled to the first reaction stage and
- d) the solids-poor phase (B) present after the solid-liquid phase separation is fed to further processing steps, such as transported to a second reaction stage and further reacted there.

Claim 27 (new): The process according to claim 26, wherein the solids-rich phase (A) is rich in undissolved melamine.

Claim 28 (new): The process according to claim 26, wherein the reaction product is taken off as a suspension from an overflow of a reactor of the first reaction stage, such as of the last reactor of the first reaction stage, and transported into the solid-liquid phase separation apparatus.

Claim 29 (new): The process according to claim 26, wherein the solid-liquid phase separation apparatus is in the form of a hydrocyclone, in the form of a centrifuge, such as in the form of a disc centrifuge, or in the form of a filter.

Claim 30 (new): The process according to claim 26, wherein at least one alcohol, such as methanol, is used and at least one aldehyde, such as a solution of formaldehyde (37% strength) in water and methanol, is used.

Claim 31 (new): The process according to claim 26, wherein the reactants are homogeneously premixed in a continuous mixer before the first reaction stage.

Claim 32 (new): The process according to claim 26, wherein the reaction takes place in at least one reactor of the first reaction stage at temperatures between 70 and 140°C and at a pressure between 2 and 30 bar.

Claim 33 (new): The process according to claim 26, wherein, after the solid-liquid phase separation apparatus, the solids-poor phase (B) is fed to at least one continuous second reaction stage, such as at least one tubular reactor for further etherification.

Claim 34 (new): The process according to claim 33, wherein the reaction in the second reaction stage is carried out under acidic conditions, such as at a pH between 5 and 6.

Claim 35 (new): The process according to claim 33, wherein the second reaction stage is carried out in the presence of heterogeneous acidic catalysts, such as acidic ion exchangers.

Claim 36 (new): The process according to claim 33, wherein at least one reactor of the second reaction stage has mixing elements, such as static mixers or packings or both.

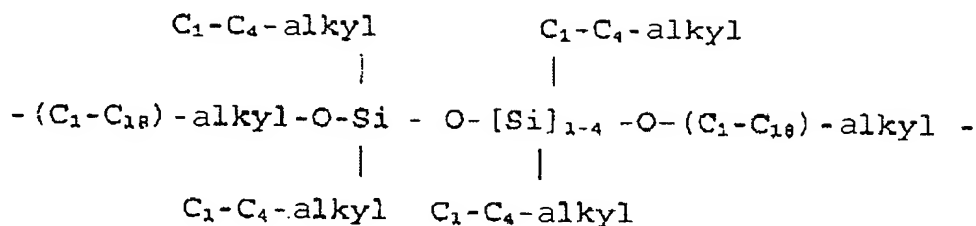
Claim 37 (new): The process according to claim 33, wherein homogeneous catalysts are mixed with the reaction mixture before the second reaction stage.

Claim 38 (new): The process according to claim 33, wherein, after the second reaction stage, a pH of more than 9 is established, such as by metering in sodium hydroxide solution.

Claim 39 (new): The process according to claim 33, wherein the reaction product of at least one second reactor in alcoholic solution is concentrated in at least one evaporation step, and C₄-C₁₈-alcohols, diols of the type HO-R-OH and/or tetrahydric alcohols based on erythritol are added to the melamine resin precondensate before, during and/or after the concentration, and the concentrated melamine resin precondensate is reacted in a third reaction stage by means of a mixer, such as a kneader.

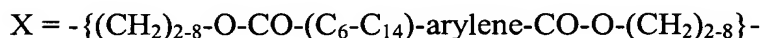
Claim 40 (new) The process according to claim 39, wherein at least one diol of the type HO-R-OH having molar masses of 62 to 20,000 or a mixture of at least two diols of the type HO-R-OH having molar masses of 62 to 20,000 are used, wherein the substituent R is selected from one of the following structures

C₂-C₁₈-alkylene,
CH(CH₃)-CH₂-O-(C₂-C₁₂)-alkylene-O-CH₂-CH(CH₃)-,
CH(CH₃)-CH₂-O-(C₂-C₁₂)-arylene-O-CH₂-CH(CH₃)-,
(CH₂-CH₂-CH₂-CH₂-CH₂-CO)_x-(CH₂-CHR)_y-,
[CH₂-CH₂-O-CH₂-CH₂]_n-,
[CH₂-CH(CH₃)-O-CH₂-CH(CH₃)]_n-,
[O-CH₂-CH₂-CH₂-CH₂]_n-,
[(CH₂)₂₋₈-O-CO-(C₆-C₁₄)-arylene-CO-O-(CH₂)₂₋₈]_n-,
[(CH₂)₂₋₈-O-CO-(C₂-C₁₂)-alkylene-CO-O-(CH₂)₂₋₈]_n-,
in which n = 1 to 200; x = 5 to 15;

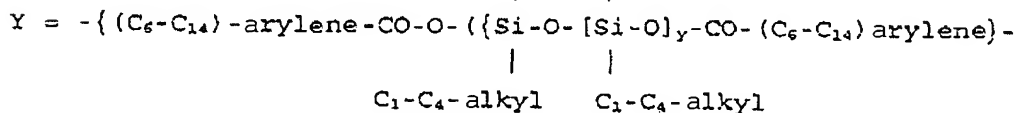
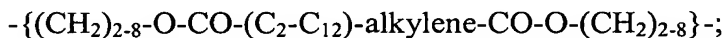


- polyester sequences containing siloxane groups and of the type
- [(X)_r-O-CO-(Y)_s-CO-O-(X)_r]-,

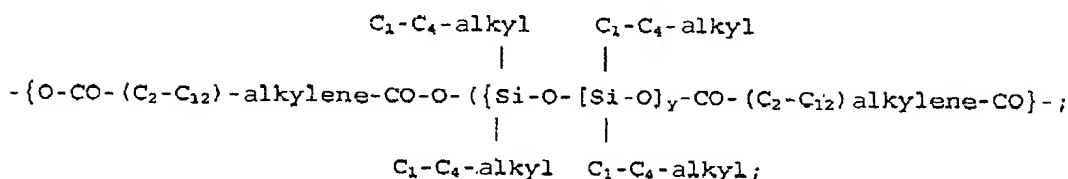
in which



or

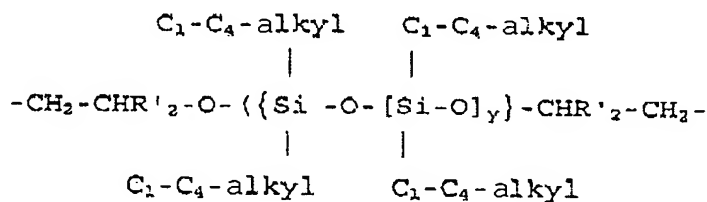


or



in which r denotes 1 to 70; s denotes 1 to 70 and y denotes 3 to 50;

- polyether sequences containing siloxane groups of the type



in which R'₂ denotes H; C₁-C₄-alkyl and y denotes 3 to 50;

- sequences based on alkylene oxide adducts of melamine of the type 2-amino-4,6-di(C₂-C₄)alkyleneamino-1,3,5-triazine sequences, or
- phenol ether sequences based on dihydric phenols and C₂-C₈-diols of the type
- (C₂-C₈)alkylene-O-(C₆-C₁₈)-arylene-O-(C₂-C₈)-alkylene sequences.

Claim 41 (new): The process according to claim 39, wherein the etherified melamine resin condensates are mixtures having average molar masses of 500 to 2500 and comprise tris(methoxymethylamino)triazine and higher molecular weight oligomers thereof.

Claim 42 (new): The process according to claim 39, wherein, before and/or during the concentration, such as before the first and/or before the second evaporator stage, and/or after the concentration, such as before the second reaction stage, acids and/or acid anhydrides dissolved in alcohol or water are added to the melamine resin precondensate.

Claim 43 (new): The process according to claim 39, wherein the concentrated melamine resin precondensate obtained after the evaporation has a concentration of 95 to 99% by weight.

Claim 44 (new): The process according to claim 39, wherein the evaporation of the low molecular weight components is effected in two stages.

Claim 45 (new): The process according to claim 39, wherein the kneader is a continuously operating extruder which is at least partly self-purging and has vacuum devolatilization.

Claim 46 (new): The process according to claim 39, wherein the kneader used is a twin-screw extruder having devolatilization zones.

Claim 47 (new): The process according to claim 39, wherein, in the continuous kneader, additionally up to 75% by mass of fillers or reinforcing fibres or both are present, additionally, reactive polymers of the type consisting of at least one of ethylene copolymers, maleic anhydride copolymers, modified maleic anhydride copolymers, poly(meth)acrylates, polyamides, polyesters or polyurethanes are incorporated, and up to 2% by mass, based in each case on the etherified melamine resin condensates, of stabilizers, UV absorbers or auxiliaries that are incorporated.

Claim 48 (new): The process according to claim 39, wherein the melamine resin condensate is discharged and granulated after a third reaction stage.

Claim 49 (new): Melamine resin products produced by means of a melamine resin condensate etherified by a direct synthesis process according to claim 26.